Formatting Instructions For NeurIPS 2022

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1 Implement Cross Entropy Cost

There is no writing part for this question.

2 Multi-class Perceptron

$$g(w_0, \cdots, w_{C-1}) = \frac{1}{P}\sum_{p=1}^{P}\left[\max_{j=0,\cdots,C-1}\left(0, -y_p \overset{\circ}{\mathbf{x}}_p^T \mathbf{w}_j\right) - \overset{\circ}{\mathbf{x}}_p^T \mathbf{w}_{y_p}\right]$$

When $C = 2$, the multi-class Perceptron cost reduces to the two-class version.

$$g(\mathbf{w}) = \frac{1}{P}\sum_{p=1}^{P}\max\left(0, -y_p \overset{\circ}{\mathbf{x}}_p^T \mathbf{w}\right)$$

36th Conference on Neural Information Processing Systems (NeurIPS 2022).

3 Complete ML Pipeline

3.1 Data Preprocessing

No writing for this part

3.2 Hyperparameter Tuning

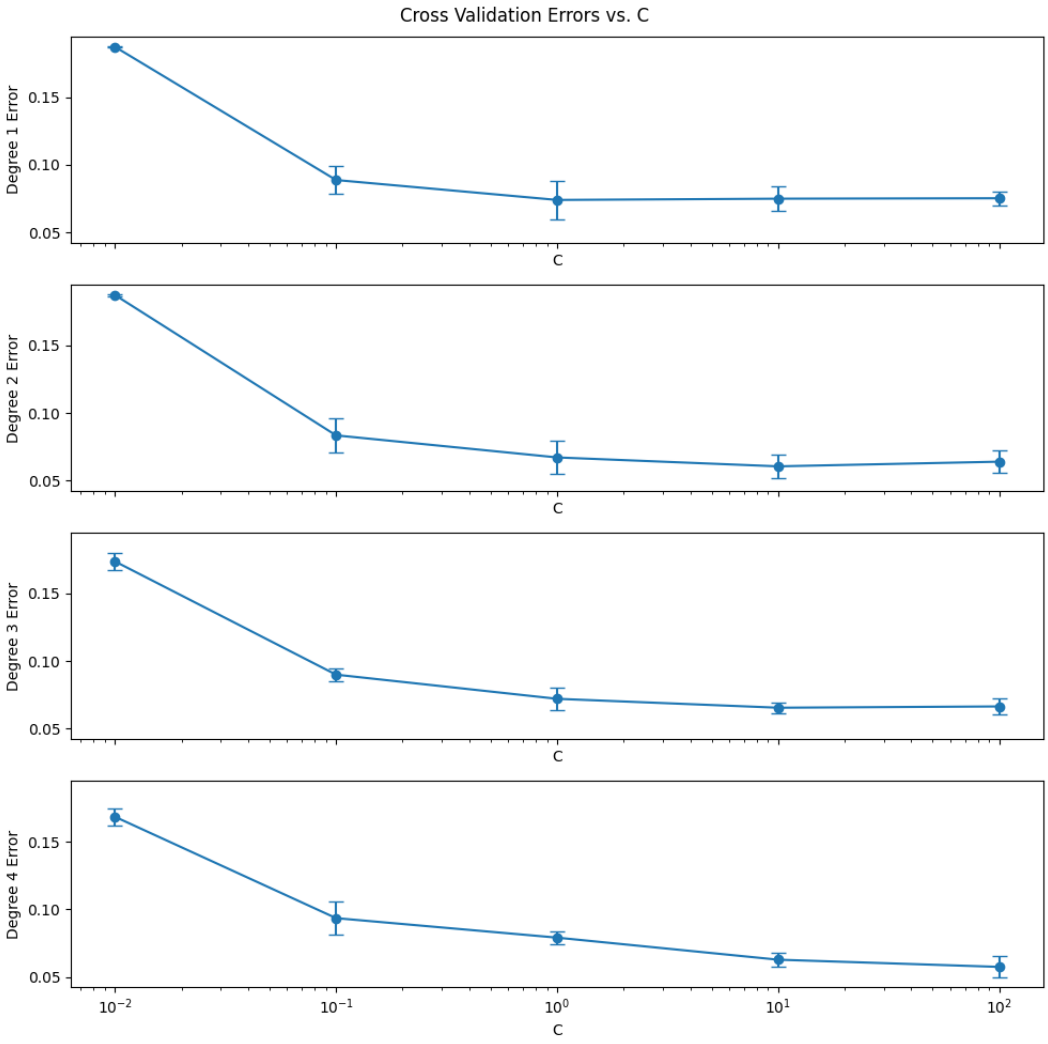

Figure 1: Cross Validation Errors vs C

3.3 Model Training and Testing

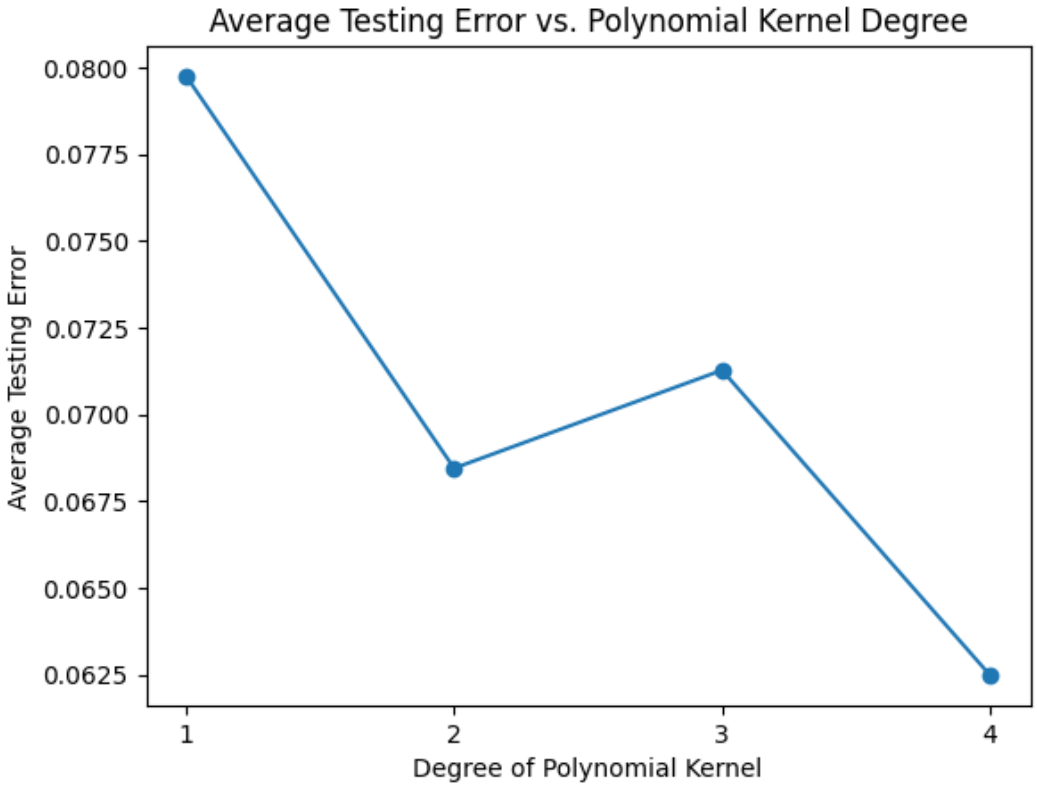

Figure 2: Average Testing Error

3.4 Results Evaluation

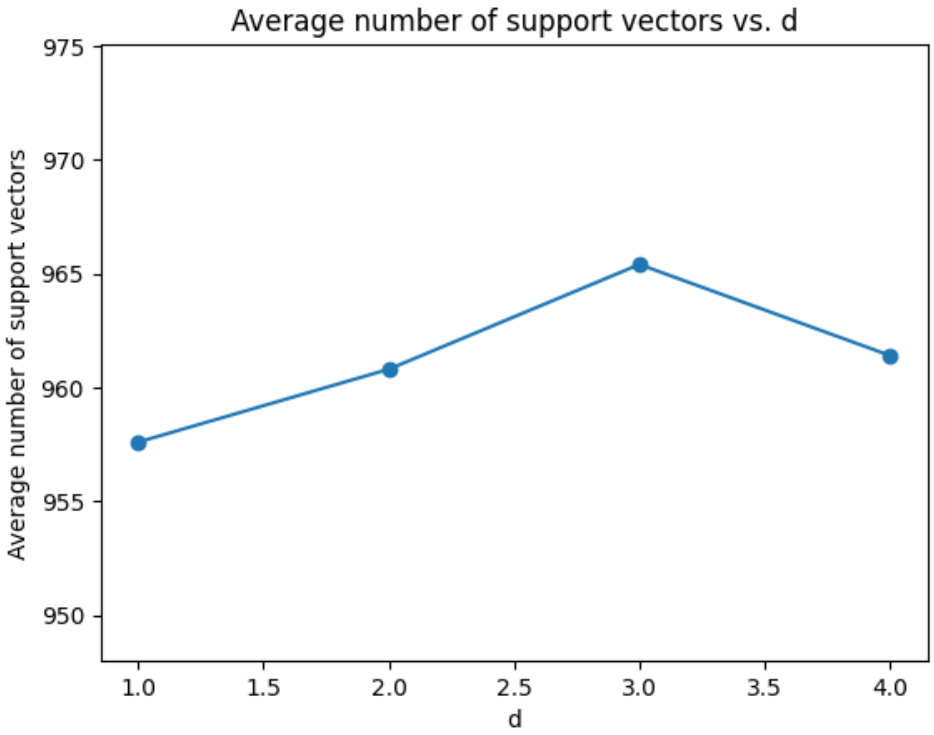

Figure 3: Average Number of Support Vectors

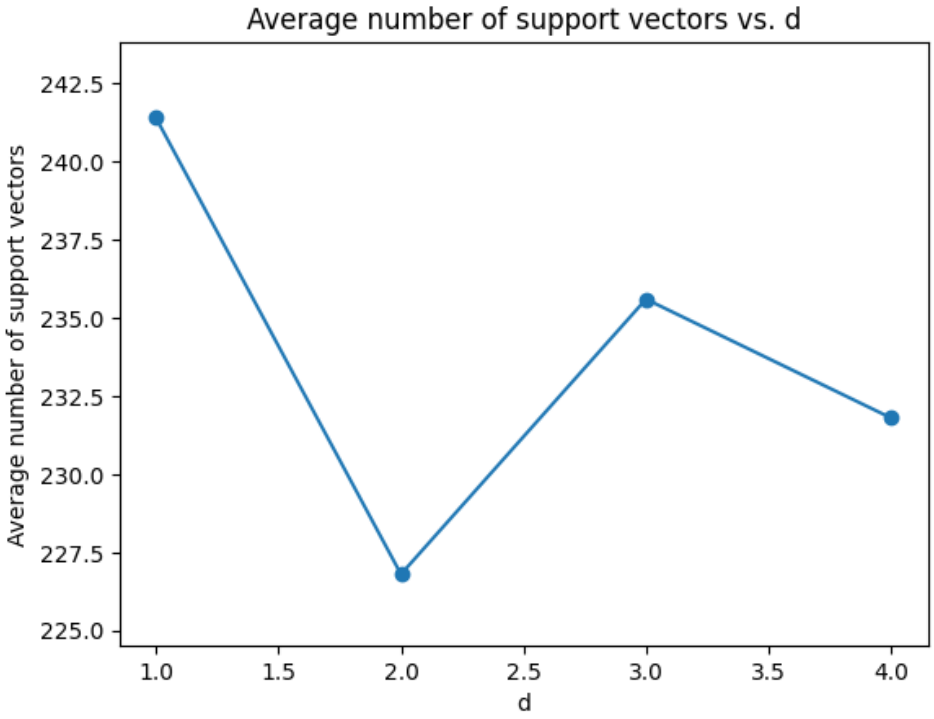

Figure 4: Average Number of Violating Support Vectors

3.5 Conceptual

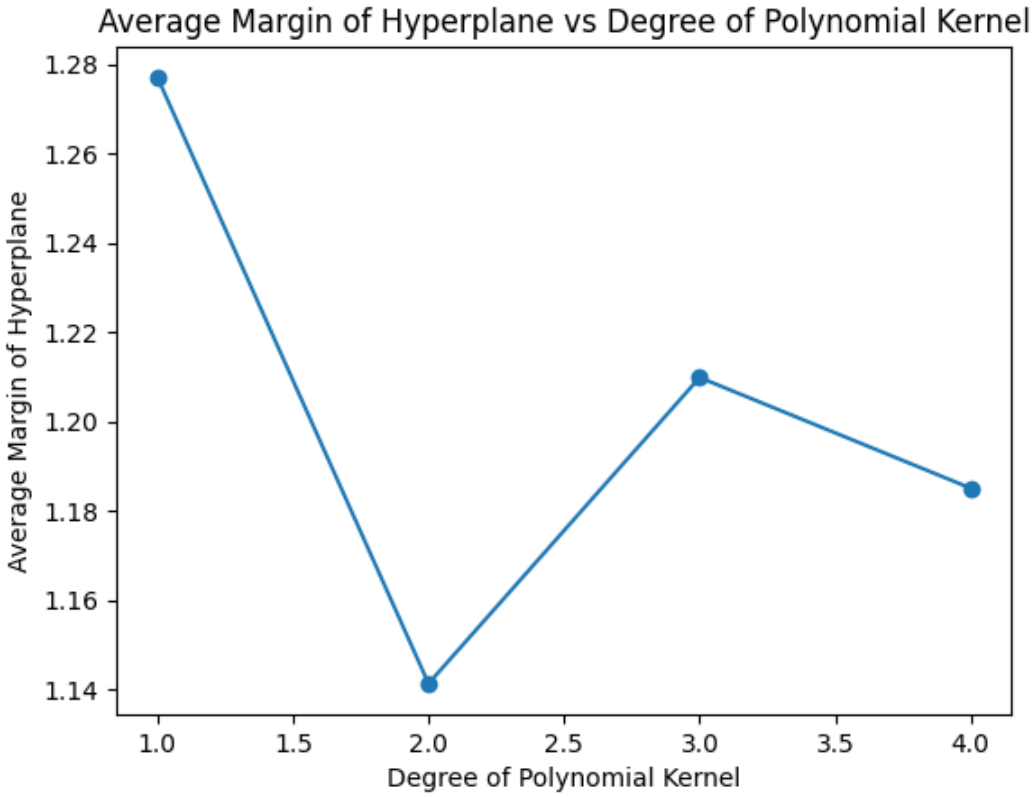

Figure 5: Average Margin of Hyperplane

References

[1] Watt, Jeremy, Borhani, Reza & Katsaggelos, Aggelos Konstantinos (2016) Machine Learning Refined.

[2] Konasani, Venkata Reddy & Shailendra Kadre (2021) Machine Learning and Deep Learning Using Python and TensorFlow.